Summary

Introduction

Northwest Aggregates (Lone Star Northwest) has submitted a request to King County to significantly increase mining over current levels at its Maury Island sand and gravel mine. King County issued a Determination of Significance (DS) for the proposal on August 11, 1998, based on its review of the project grading plan and environmental checklist dated May 1998 (this checklist is available for review at the Vashon library). The DS documented the County's determination that significant environmental impacts could result from the proposal and an environmental impact statement (EIS) is required. This EIS is being prepared to meet the requirements of the State Environmental Policy Act (SEPA), per Washington Administrative Code, Chapter 197-11.

The proposal would require revisions to the applicant's existing King County Grading Permit and their existing Surface Mining Reclamation Permit issued by the state Department of Natural Resources (DNR), as well as a Shoreline Substantial Development Permit through King County.

Proposal Objectives

Lone Star Northwest wishes to increase its maximum production rate at the Maury Island mine from roughly 10,000 tons of sand and gravel per year (the level of production that has occurred in recent years) to up to 7.5 million tons per year (that is, 5.5 million cubic yards).

The applicant also wishes to be able to barge mined materials 24 hours a day, 7 days a week. This level of barging, which would occur periodically as contracts are awarded and completed, increases the applicant's ability to win contracts and to take advantage of peak demands in a variable market.

Purpose and Need

The applicant's purpose and need for this project is to meet the anticipated high market demand for sand and structural fills (materials which are abundant on the site). While the applicant operates several mines in the region, the Maury Island site contains a high amount of quality fills, products that are not as abundant at other sites operated by the applicant.

Summary of Proposal and Alternatives

This environmental impact statement (EIS) analyzes the applicant's Proposed Action, two additional alternatives that include mining with reduced hours of barging, and the No-Action Alternative. Each of these alternatives is described below. Features of the alternatives are summarized in Table S-1 at the end of this chapter.

Description of the Proposed Action

Scale of Operation

Under the Proposed Action, sand and gravel extraction could approach 7.5 million tons per year (or 5.5 million cubic yards), with essentially all of the increased material being sent to off-island markets via barge. No barging has been conducted at the site for 20 years, although the dock used during previous barging remains onsite. Mining rates would depend on the number of large sand and gravel contracts for off-island markets.

For purposes of predicting the environmental effects of the mining operation, this EIS assesses the site at full production with the mining and barging of 7.5 million tons per year.

When demand for sand is low, the level of operation at the site would also be low. It is even likely that the site would be idle for periods of time, again depending on the market.

It follows that the overall life span of the mine depends on market conditions and the number of large sand and gravel projects secured by the applicant. At full production, the site deposits could be mined out in 11 years. Of course, the lower the level of production, the longer the operation could last. The analysis in this EIS assumes a 35-year operating window before the site is closed.

As under current practices, operations would also provide materials for the local market (Maury Island and Vashon Island). The amount of sand and gravel extracted for the local market was estimated to average approximately 15,000 tons in 1998 (range of 10,000 to 20,000 tons per year) with an annual increase assumed to be 2.5 percent for this EIS analysis; actual increases would depend on market needs and local growth. This would be delivered via truck, at a rate not to exceed 20 trucks per day. At some point, the increase in extraction for the local market would slow and eventually halt, since demand for sand and gravel within the confines of Vashon/Maury Island is limited.

Clearing and Ground Preparation

Clearing of the site would be phased with mining activities. Clearing would occur at scheduled phases of approximately 32 acres each. No more than two phases, or 64 acres of mining/reclamation activities, would be in process at any one time. Prior to mining of each approximately 32-acre phase, vegetation would be cleared and chipped onsite to be used in reclamation. Some large woody material (stumps and logs) would be kept intact to be used as part of the restoration effort, aiding in soil stability, soil organic content, and wildlife habitat.

To address public safety concerns regarding arsenic contamination of site soils, the applicant is proposing to fully contain contaminated materials at the site within a sealed berm. No contaminated materials would be removed from the site. At full capacity (when mining is complete), the berm would measure up to 30 feet high and 2,100 feet long. The berm would be located on the northern edge of the site, but outside of the 50-foot vegetated buffer (see next paragraph), which would be maintained.

Along the edge of the mining pit, a 50-foot-wide naturally vegetated buffer would be retained around the perimeter of the site. With the exception of the existing dock area, a 200-foot-wide naturally vegetated buffer would be retained along the Puget Sound shoreline. No mining or other activity would be permitted within this buffer.

Maintenance of the 200-foot shoreline buffer and a 50-foot buffer between the site and neighboring properties would result in approximately 14 percent of the site being retained as open space and upland habitat.

Table S-1 outlines other major features of the Proposed Action.

Alternative 1- Reduced Barging Hours, Scenario 1

Alternative 1 differs from the Proposed Action in that barge loading would be restricted to 16 hours each weekday and 9 hours on Saturday (Monday – Friday 6 a.m. to 10 p.m., Saturday 9 a.m. to 6 p.m.). This alternative was developed by the EIS team in response to public comments and is intended to allow the applicant, public, and decision makers at King County to compare the environmental impacts of the Proposed Action to this hypothetical scenario of reduced hours for barge loading.

The reduced hours would reduce the ability of the applicant to provide sand and gravel products on demand, and, therefore, does not meet the applicant's project objectives as well as the Proposed Action. The applicant's daily capacity to move material offsite during peak demands would be about half that of the Proposed Action.

Table S-1 compares other features of this alternative with the Proposed Action.

Alternative 2 - Reduced Barging Hours, Scenario 2

Under Alternative 2, barge loading would be restricted to 12 hours each weekday and on Saturday (Monday - Saturday 7 a.m. to 7 p.m.). As with Alternative 1, Alternative 2 would reduce the ability of the applicant to provide sand and gravel products on demand, and, therefore, does not meet the project objectives as well as the Proposed Action.

The applicant's capacity to move material offsite during peak demands would be only about one-quarter that of the Proposed Action. Again, as with Alternative 1, this may affect the operation in two ways, but potentially at a greater level than with Alternative 1. First, the applicant may receive fewer contracts than under Alternative 1, since the 75 percent reduction in maximum daily production rate may be too low to meet the required delivery schedules of certain contracts. Secondly, for contracts that are secured, the mine would need to operate at maximum capacity for approximately four times the period that would be required under the Proposed Action.

Table S-1 compares other features of this alternative with the Proposed Action.

No-Action Alternative

Under SEPA, King County must evaluate the "No-Action Alternative", which is defined by the state SEPA Handbook as "what would be most likely to happen if the proposal did not occur".

Because the SEPA rules do not define what the No-Action Alternative must entail, King County has some discretion in its formulation. The applicant already has a permit to extract sand from the site up to roughly 50 feet from the property boundaries (200 feet from the shoreline). For the purpose of comparative analysis and to understand the environmental effects of the applicant's proposal, this EIS considers the No-Action Alternative as the status quo, or essentially how the mine has operated on average over the past 20 years.

It is important to note that should King County decide to not approve the applicant's proposal, something other than the No-Action Alternative evaluated here may result, particularly in light of the current and expected high demand for gravel in the Puget Sound region. However, it would be highly speculative to predict exactly what would result following possible legal challenges or other forms of negotiations. King County determined that to attempt to predict a level of operation that may result from denying the current proposal would confuse the issues, rather than clarify them. Therefore, No-Action is evaluated in this EIS as a continuation of current mining levels and practices.

No-Action, then, assumes ultimate excavation and resource recovery of the mine identical to the Proposed Action, but over a much longer period. It would result in a similar level of terrestrial impact, over a much longer period. The most significant difference under No-Action is the assumed lack of barging. (Again however, this is not to say that barge loading would be prohibited if the applicant's proposal is denied. The applicant's existing mining and barging rights are not necessarily limited to the No-Action Alternative.)

The features of the No-Action Alternative are summarized and compared to the Proposed Action in Table S-1.

Significant Areas of Controversy and Issues to be Resolved

As required under SEPA (WAC 197-11-408), King County conducted scoping to "narrow the scope of [the] EIS to the probable significant adverse impacts and reasonable alternatives, including mitigation measures." Toward this end, King County invited agencies, affected Tribes, and members of the public to comment on the Determination of Significance (WAC 197-11-360).

The major controversial issues identified during this process include groundwater supplies, visual and noise disturbances, arsenic contamination of topsoils, removal of madrone forest, and potential effects on marine habitat. These issues, and others questions raised during scoping, are listed at the beginning of Chapters 3 through 12 of this EIS in the sections titled "Primary Issues". These issue questions are then addressed in the impact analysis in each chapter.

Phased Review

No phased review is anticipated.

Summary of Impacts, Mitigation, and Significant Unavoidable Adverse Impacts

Tables S-2 through S-11 at the end of this chapter summarize impacts, mitigation, and significant unavoidable adverse impacts for each of the alternatives.

Table S-1. Comparison of Alternatives Features, Maury Island Mining Operations

Component	*No-Action Alternative*	*Proposed Action*	*Alternative 1*	*Alternative 2*
SCALE OF OPERATION				
Area to be Mined	Ultimately, 193 acres, but much smaller area within the foreseeable future.	193 acres.	Same as Proposed Action	Same as Proposed Action.
Estimated Maximum Annual Amount of Extraction	20,000 tons	7.5 million tons	5.72 million tons	3.12 million tons
Duration of Project	Mining to occur indefinitely.	Between 11 and 50years. Assumed to be 35 years for analysis in the EIS.	Between 15 and 60 years. Assumed to be 40 years for analysis in the EIS.	Between 30 and 75 years. Assumed to be 50 years for analysis in the EIS.
Local Market Sales	Local market sales would average 15,000 tons annually (range 10,000 to 20,000 tons per year) of sand and gravel, with an annual assumed increase of 2.5%.	Same as No-Action.	Same as No-Action.	Same as No-Action.
Trucking	Average hauling less than 5 trucks/day, over a 6-day week, with a maximum of 20 trucks/day each way (40 one-way trips), assumed to increase at 2.5% annually	Same as No-Action.	Same as No-Action.	Same as No-Action.
Hours of Active Mining	Current hours of mining: M-F 7 am - 7 pm Sat 9 am - 6 pm Maintenance could occur at any time.	M-F 6 am - 10 pm Sat 9 am – 6 pm Maintenance could occur at any time.	M-F 6 am - 10 pm Sat 9 am - 6 pm Maintenance could occur at any time.	M-F 7 am - 7 pm Sat 9 am – 6 pm Maintenance could occur at any time.
Hours of Barge Loading	None	24 hours, 7 days per week	16 hours per weekday, 9 hours on Saturday: M-F 6 am - 10 pm Sat 9 am - 6 pm	12 hours per day, M-Sat 7 am - 7 pm

Table S-1. Continued

Component	*No-Action Alternative*	*Proposed Action*	*Alternative 1*	*Alternative 2*
Barging	None	Maximum of four 10,000-ton barges loaded in each 24-hour period (or a greater number of smaller barges).	Maximum of two 10,000-ton barges loaded in each weekday and one on Saturday (or a greater number of smaller barges).	Maximum of one 10,000-ton barge loaded in each working day (or a greater number of smaller barges).
Employment	5 staff or fewer would operate the site.	2 to 20 staff would operate the site at any one time, with two shifts for mining and three shifts for barge loading.	2 to 20 staff would operate the site at any one time, with two shifts for mining and for barge loading.	2 to 20 staff would operate the site at any one time, with one shift for mining and for barge loading.
Clearing and Ground Preparation	Conducted in slow progression from the central portion of the site out.	Phased clearing, with two areas up to 32 acres being cleared and prepared for mining at any one time. Up to 64 acres of land being mined or actively reclaimed at any one time.	Same as Proposed Action.	Same as Proposed Action.
FACILITIES AND EQUIPMENT				
Structures	None	Small office, storage and security areas, and portable restroom. Repairs to dock structure.	Same as Proposed Action.	Same as Proposed Action.
Access and Roads	Use existing.	Same as No-Action, but additional roads would be constructed as mining progresses.	Same as Proposed Action.	Same as Proposed Action.
Heavy Equipment	Wheel loaders used to load trucks.	Combination of dozers and wheel loaders used for barge-based projects.	Same as Proposed Action.	Same as Proposed Action.
Processing Equipment	Portable screening plant as needed (expected on site for about a month every 5 to 10 years).	Portable crushing and screening plant as needed (expected on site for 1 to 2 months once every 3 to 4 years).	Same as Proposed Action.	Same as Proposed Action.

Table S-1. Continued

Component	*No-Action Alternative*	*Proposed Action*	*Alternative 1*	*Alternative 2*
Conveyance Equipment	Material loaded onto trucks for on-island deliveries.	Truck loading for on-island deliveries. Material for off-island deliveries would be transported from mined areas to barges using a conveyer belt system, ranging in length from 1,200 to 3,400 feet.	Same as Proposed Action.	Same as Proposed Action.
RECLAMATION	Low levels of mining would require little reclamation. Most reclamation done in small patches to minimal standards (as required by DNR permit). Little or no terracing for several decades.	Active mining/reclamation confined to 64 acres at one time, up to two 32-acre phases. Reclamation would follow DNR guidelines and may include use of native plants and habitat features for wildlife. Topsoil would be manufactured onsite and augmented with offsite materials as necessary to meet DNR reclamation standards.	Same as Proposed Action.	Same as Proposed Action.
BUFFERS				
Adjacent Property Buffers	50-foot vegetated buffers around perimeter of site.	Same as No-Action.	Same as No-Action.	Same as No-Action.
Shoreline Buffer	200-foot shoreline buffer from ordinary high water mark of Puget Sound.	Same as No-Action.	Same as No-Action.	Same as No-Action.
Stormwater Management	No stormwater pond constructed.	A new stormwater pond would be constructed.	Same as Proposed Action.	Same as Proposed Action.

This page left blank intentionally.

Table S-2. Summary of Significant Impacts, Mitigation, and Unavoidable Adverse Impacts for Air Quality

Significant Impacts					
Proposed Action	***Alternative 1***	***Alternative 2***	***No-Action***	***Mitigation for Action Alternatives*** *(R = mitigation measures required or already proposed by the applicant A = additional mitigation measures)*	***Significant Unavoidable Adverse Impacts***
Primary Issue: Would fugitive dust resulting from the project exceed regulatory standards at the property line or at nearby residential locations?					
Dust levels below regulatory standards. The Fugitive Dust Model (FDM) indicated the worst-case 24-hour PM10 concentrations would be less than the regulatory standard at three locations representative of when mining activities would be closest to the property lines. Annual average PM10 concentrations are expected to be lower than the modeled 24-hour average concentrations and below annual standards. (Dust from soils containing arsenic would be controlled using measures approved for handling of hazardous waste; see Chapter 10.)	**Dust levels below regulatory standards.** PM10 levels would be lower than those modeled for the Proposed Action and below the regulatory standards.	**Same as Alternative 1**.	**No dust-related impacts** due to low level of mining.	PSAPCA would require the applicant to obtain a Notice of Construction permit and to apply Best Available Control Technology (BACT) to prevent visible dust plumes from being carried past the property line. Once the mine is in operation, PSAPCA staff would inspect the site at regular intervals, or upon the receipt of complaints. (R) The applicant would develop a dust control plan in cooperation with PSAPCA that would likely include (1) minimizing emissions from mined materials by maintaining a relatively high moisture content via water spraying, (2) maintaining a 50-foot-wide vegetated buffer around the site's perimeter as required by King County, and (3) permanently stabilizing reclaimed areas by hydroseeding or other procedures, according to the reclamation performance standards, as soon as mining is completed. (R)	None anticipated for any of the alternatives. With implementation of proposed and required mitigation measures, dust levels would stay below regulatory standards.

Table S-2. Continued

Significant Impacts					
Proposed Action	***Alternative 1***	***Alternative 2***	***No-Action***	***Mitigation for Action Alternatives*** *(R = mitigation measures required or already proposed by the applicant A = additional mitigation measures)*	***Significant Unavoidable Adverse Impacts***
				The portable crushing plant, if it were to operate at a capacity greater than 150 tons per hour, would be subject to federal New Source Performance Standard limits for dust emissions. (R) The main access road to SW 260th Street could be paved to reduce emissions and the potential for high PM10 concentrations near the roads. (A) Once paved, the road could be washed and swept to prevent dirt and dust from accumulating and then being reentrained by passing vehicles to become airborne PM10. (A) A manual or automated wheel/vehicle-washing system could be situated so as to clean trucks and their tires as they leave the site. (A) Buffers adjacent to Gold Beach and Sandy Shores could be expanded to further address community concerns about dust. (A)	

Table S-3. Summary of Significant Impacts, Mitigation, and Unavoidable Adverse Impacts for Geology/Hydrogeology

Significant Impacts					
Proposed Action	***Alternative 1***	***Alternative 2***	***No-Action***	***Mitigation for Action Alternatives*** *(R = mitigation measures required or already proposed by the applicant A = additional mitigation measures)*	***Significant Unavoidable Adverse Impacts***
Primary Issue: Would mining as proposed affect recharge of the aquifer system or affect the availability of water to residents on Vashon/Maury Islands?					
No effects on local drinking water supply related to aquifer recharge because (1) appropriate drainage and recharge designs would be used, (2) the site does not contribute to lateral interflow, (3) the site is located within a groundwater discharge area rather than a recharge area, (4) the amount of water reaching the aquifer would not be reduced, and (5) during operation and early periods of reclamation, recharge would actually increase because of vegetation removal.	**Similar to Proposed Action.** Effects of increased recharge through vegetation removal would occur over a longer period because the site would remain open for a longer time.	**Same as Alternative 1.**.	**Same as Alternative 1.**	To minimize changes in the rate and path of recharge waters on the site, the applicant's proposed drainage plan could be modified to more accurately mimic the existing infiltration pattern. The standard benches proposed by the applicant could be constructed with a reverse slope back into the hill to encourage infiltration in the upper portions of the mine, rather than directing all water down to a single detention/infiltration pond. (A) A series of temporary water collection ponds could be prepared on upper slopes as part of each mining phase. Most areas under active mining would require no surface water detention or storage since water would readily enter the exposed sand and gravels, rather than washing over the surface and collecting in pools. However, where roads are present, where compaction has occurred, or near areas of stockpiled tills or other less permeable materials, appropriate drainage and upslope infiltration ponds should be constructed. (A) During reclamation, each completed cell should allow water to infiltrate within the cell, rather than being directed off to some central portion of the site. (A)	Mining would eventually reduce the deep layer of sand and gravel deposits at the site. This would in turn reduce the time it takes water to reach the water table and would likely result in greater peaks and lows in recharge rates over the course of a year. This impact is not considered significant, however, since the actual amount of recharge (the key element of concern) would not be significantly affected. The amount of water that reaches the

Table S-3. Continued

Significant Impacts					
Proposed Action	***Alternative 1***	***Alternative 2***	***No-Action***	***Mitigation for Action Alternatives*** *(R = mitigation measures required or already proposed by the applicant A = additional mitigation measures)*	***Significant Unavoidable Adverse Impacts***
					site as rain would not change as a result of mining activities. Removal of vegetation would temporarily increase the amount of water that enters the water table, but this amount is not particularly significant in terms of the overall aquifer. Additional mitigation measures presented in Section 4.4.2 would serve to further reduce impacts and address public concerns.

Table S-3. Continued

Significant Impacts					*Significant Unavoidable Adverse Impacts*
Proposed Action	***Alternative 1***	***Alternative 2***	***No-Action***	***Mitigation for Action Alternatives*** *(R = mitigation measures required or already proposed by the applicant A = additional mitigation measures)*	
Minimal effect on Island water resources from using water for dust control. At maximum use, the project would increase water consumption on the Island by 0.8 percent. Much less water would be required on annual average. Conservation measures and using a variety of water sources would help minimize impacts.	**Potentially less water used for dust control** compared to Proposed Action.	**Same as Alternative 1.**	**Negligible amount of water needed for dust control.**	The applicant should utilize conservation measures for water consumption, including use of misting and related techniques. Such conservation measures should be specified in a water conservation plan to be prepared and approved by King County as a condition of permit approval. (A)	None expected.
Primary Issue: Would mining affect groundwater quality?					
No significant effect on groundwater quality because (1) a relatively small amount of machinery and fuel would be required, (2) at least 15 feet of sand/gravel would be maintained between the floor of the mine and the water table, and this would filter out sediments, and (3) the site is at a groundwater discharge point.	Same as Proposed Action.	Same as Proposed Action.	Same as Proposed Action.	To prevent impacts from sedimentation, the walls of the mining pit would slope toward the mine floor and away from Puget Sound to reduce runoff into the Sound. A retention/infiltration pond would be constructed at the bottom of the mine site. This pond would be sized according to DNR and King County standards for a 25-year, 24-hour storm event. Additional sedimentation ponds would be constructed to reduce the potential for siltation to limit the infiltration capacity of the retention/infiltration pond. (R) Rock check dams would be established at minimum intervals of 75 feet where gradients exceed 10 percent in the benches or channelized runoff paths to reduce velocities and sediment transport impacts. Runoff paths would be directed into the retention/infiltration pond. (R)	None expected.

Table S-3. Continued

Significant Impacts					
Proposed Action	***Alternative 1***	***Alternative 2***	***No-Action***	***Mitigation for Action Alternatives*** *(R = mitigation measures required or already proposed by the applicant A = additional mitigation measures)*	***Significant Unavoidable Adverse Impacts***
				A designated fueling area could be established to contain possible fuel spills. The area could be lined with fabric under gravel, could be constructed of concrete with appropriate spill capture reservoirs, or could involve the placement of absorbent pads. (A)	
Primary Issue: Would the mining activity breach an aquifer or otherwise impact adjacent groundwater wells being used by local residents?					
No potential to breach an aquifer because the materials to be mined are located above the aquifer. A 15-foot separation would be maintained between the bottom of the mine floor and the groundwater table.	Same as Proposed Action.	Same as Proposed Action.	Same as Proposed Action.	A minimum 15-foot buffer would be maintained between the bottom of the pit floor and the measured static groundwater level. While unlikely to occur, action plans for groundwater seepages into the mining area would be included in the mining plan, including immediate notification of King County and technical experts. (R) To determine static groundwater levels, the applicant will measure the static water levels of the primary aquifer in monitoring wells, according to the terms outlined in the required Groundwater Monitoring Plan. Any natural fluctuations in the static levels of the aquifer would be identified as mining progresses, and the depth of mining would be altered as necessary to maintain the 15-foot buffer. (R)	None expected.

Table S-3. Continued

Significant Impacts					
Proposed Action	***Alternative 1***	***Alternative 2***	***No-Action***	***Mitigation for Action Alternatives*** *(R = mitigation measures required or already proposed by the applicant A = additional mitigation measures)*	***Significant Unavoidable Adverse Impacts***
				Groundwater levels would be monitored on a quarterly basis over a 5-year period following approval of the revised Grading Permit and Surface Mining Reclamation Permit. After 5 years, monitoring may be reduced to annual measurements if no impacts to water levels have been identified. Monitoring would cease during the reclamation phase. (R) To prevent possible intrusion of the mine into the water table, groundwater levels should be monitored as each cell approaches final grade. Adjustments of final elevations should be made to accommodate potential increases in groundwater levels. (A)	

Table S-4. Summary of Significant Impacts, Mitigation, and Unavoidable Adverse Impacts for Terrestrial Plants and Animals

Significant Impacts					
Proposed Action	***Alternative 1***	***Alternative 2***	***No-Action***	***Mitigation for Action Alternatives*** *(R = mitigation measures required or already proposed by the applicant A = additional mitigation measures)*	***Significant Unavoidable Adverse Impacts***
Primary Issue: Would the project adversely affect a plant or animal listed or proposed for listing under the Endangered Species Act, or other species listed by the state, tribes, or King County as sensitive?					
No significant impacts on listed species. Peregrine falcon and bald eagle are not likely to be significantly affected by the project because no key habitat would be affected.	**Negligible impact on threatened or endangered species** (same as Proposed Action).	Same as Alternative 1.	**Little or no effect on bald eagle or peregrine falcon** (similar to Proposed Action).	None required.	None expected.
No significant impacts on great blue heron. The Maury Island heron rookery, 2 miles northeast, and the Dumas Bay rookery, 4 miles southeast, are located too far from the site to be impacted by the Proposed Action. Heron foraging on the shoreline areas of the site is not expected to change significantly.	Same as Proposed Action.	Same as Proposed Action.	Same as Proposed Action.	None required.	None expected.
No significant impacts on osprey. Osprey use of the site is limited to occasional foraging or perching, and such use would not be precluded by the Proposed Action.	Same as Proposed Action.	Same as Proposed Action.	Same as Proposed Action.	None required.	None expected.
Potential for flycatcher nest destruction during clearing if nests exist onsite. Olive-sided or willow flycatcher nests could be destroyed during clearing if trees are removed during the breeding season (generally from April through June). Over time, reclaimed areas could eventually provide suitable habitat.	**Similar to Proposed Action.** Since mining would likely progress at a slower rate, so too would loss of habitat.	Same as Alternative 1.	**Continued clearing would have similar impacts as the Proposed Action**, but clearing would take place at a much slower pace and over a longer time.	Seasonal restrictions on clearing, and surveys for nesting birds, could be used to reduce impacts of clearing during the breeding season. Preventing clearing from March 1 to July 15 of any given year (or as otherwise determined through consultation with the WDFW) would greatly reduce the potential for affecting nesting birds. (A)	Impacts on nesting birds can be avoided through seasonal clearing restrictions.

Table S-4. Continued

Significant Impacts					***Significant Unavoidable Adverse Impacts***
Proposed Action	***Alternative 1***	***Alternative 2***	***No-Action***	***Mitigation for Action Alternatives*** *(R = mitigation measures required or already proposed by the applicant A = additional mitigation measures)*	
Minor effects on pileated woodpecker. No pileated woodpecker nest site or key foraging area would be disrupted by the Proposed Action. Clearing of forest would remove currently marginal habitat that is likely used as part of much larger foraging areas. Clearing would delay the development of habitat on the site by about 50 years.	**Similar to Proposed Action.** Since mining would likely progress at a slower rate, so too would loss of habitat.	Same as Alternative 1.	**Continued clearing would have similar impacts as the Proposed Action**, but clearing would take place at a much slower pace and over a longer time.	None required.	None expected.
Negligible impact on purple martins. Purple martins are not expected to nest on the site, and no shoreline habitat would be removed	Same as Proposed Action.	Same as Proposed Action.	Same as Proposed Action.	None required.	None expected.
Minor effects on other cavity-nesting birds. Habitat is currently only marginal for other cavity-nesting birds (woodpeckers, creepers, owls, nuthatches, and other birds) due to the lack of suitable nesting habitat. Removal of forest would delay the eventual development of habitat for cavity-nesting birds by about 50 years.	**Similar to Proposed Action.** Since mining would likely progress at a slower rate, so too would loss of habitat.	Same as Alternative 1.	**Continued clearing would have similar impacts as the Proposed Action**, but clearing would take place at a much slower pace and over a longer time.	None required.	None expected.
Primary Issue: What would the loss of existing madrone imply in terms of (1) regulations, (2) functional values of madrone forest on the site, and (3) regional distribution of madrone?					
No significant impact in terms of regulatory restrictions because clearing of madrone (assuming Best Management Practices) is not prohibited by law.	Same as Proposed Action.	Same as Proposed Action.	Same as Proposed Action.	None required.	None expected.

Table S-4. Continued

Significant Impacts					*Significant Unavoidable Adverse Impacts*
Proposed Action	***Alternative 1***	***Alternative 2***	***No-Action***	***Mitigation for Action Alternatives*** *(R = mitigation measures required or already proposed by the applicant A = additional mitigation measures)*	
Reduction of onsite madrone. Clearing would remove habitat for several common species of wildlife and reduce other benefits of forest, including production of oxygen, visual enhancement, and human use and enjoyment of madrone woodlands. These losses could be offset over time by proper site reclamation.	**Similar to Proposed Action.** Reduction of night barging and lower maximum production ability would likely result in slower removal and restoration of forest, but, ultimately, the same result as the Proposed Action.	**Similar to Alternative 1**, but with an expected slower rate of forest removal and restoration.	**Very slow loss of onsite madrone** should the applicant be restricted to only current levels of mining.	DNR or King County could call for replacement of madrone as part of the reclamation plan. The reclamation plan would need to include (1) performance standards; (2) planting of madrone cuttings if seedlings do not establish naturally; (3) control of Scot's broom and other plants that may discourage the establishment of madrone; (4) irrigation of seedlings during August/September; and (5) monitoring of performance standards, with required corrective actions for below-standard areas. (A) Additional actions such as mimicking the natural disturbance regime, controlling weeds during the first 5 – 10 years of stand replacement, and using madrone stocks native to Maury Island could also be used. (A)	Removal of most of the existing madrone forest and associated wildlife habitat is an unavoidable result of mining the site. With additional mitigation measures, this impact could be greatly offset since madrone forest and other wildlife habitats could be reestablished on reclaimed lands.
Notable loss of madrone on Maury Island; minor loss of madrone within regional context. Although declining, madrone is still relatively common in the region and expected to persist throughout Puget Sound and the San Juan Islands. On Maury Island, the loss would be more notable since development has removed much of the other existing madrone.	Same as Proposed Action.	Same as Proposed Action.	Same as Proposed Action.	None required.	None expected.

Table S-4. Continued

Significant Impacts					
Proposed Action	***Alternative 1***	***Alternative 2***	***No-Action***	***Mitigation for Action Alternatives*** *(R = mitigation measures required or already proposed by the applicant A = additional mitigation measures)*	***Significant Unavoidable Adverse Impacts***
Primary Issue: Over the life of the mine, what is the overall effect on habitat of reactivating high-production mining on the site?					
Reduced wildlife habitat onsite. At any one time, up to 64 acres of the site would be of little value to wildlife. Habitat for some species would exist within the vegetated buffer surrounding the site, within areas yet to be mined, and within reclaimed areas. Species that require more interior habitat would leave these areas.	**Similar to Proposed Action**, but clearing and restoration would likely progress at a slower pace. Since the project would likely last longer, impacts associated with disturbance would also last longer. Disturbance would be much less at night, and nighttime wildlife use of the site and surrounding lands may be greater.	**Similar to Alternative 1**, only with a further reduction in mining capacity and associated decrease in the pace of mining across the site.	**Rate of habitat loss much less than Proposed Action** if the operation continues as it has over the past 20 years. Many portions of the site and associated habitats would remain indefinitely.	Mined areas would be revegetated with shrubs and trees as outlined in the reclamation plan submitted by the applicant to DNR. (R) Soils manufactured onsite, or offsite soils, or a combination would be used to establish planting soils. Existing topsoils would be mostly unavailable because of arsenic concerns. (R) The applicant has proposed to create a small wetland community around the retention pond at the foot of the slope after mining is completed. (R)	Removal of most of the existing madrone forest and associated wildlife habitat is an unavoidable result of mining the site. With additional mitigation measures, this impact could be greatly offset, since madrone forest and other wildlife habitats could likely be reestablished on reclaimed lands.
Change in habitat types onsite after reclamation. Reclaimed areas would provide different habitat values. More common species such as American robin, northern flicker, song-sparrow, and American crow would predominate, with fewer forest species, such as woodpeckers, creepers, and chickadees.	**Similar to Proposed Action** but clearing and restoration would likely progress at a slower pace.	**Similar to Alternative 1**, with a reduced pace of mining and reclamation.	**Rate of habitat loss and reclamation much less than Proposed Action.**	Mined areas would be revegetated as mentioned for above impact. (R) Native plants could be used in reclaimed areas. (A)	None expected with additional mitigation (see above).

Table S-4. Continued

Significant Impacts					*Significant Unavoidable Adverse Impacts*
Proposed Action	***Alternative 1***	***Alternative 2***	***No-Action***	***Mitigation for Action Alternatives*** *(R = mitigation measures required or already proposed by the applicant A = additional mitigation measures)*	
Potential for reclaimed areas to develop stands of invasive, weedy species that provide poor wildlife habitat. Assuming monitoring, restoration, and invasive-plant control, native plant communities would develop over time and become similar to existing forests in about 50 years.	**Similar to Proposed Action** but clearing and restoration would likely progress at a slower pace.	**Similar to Alternative 1**, with a reduced pace of mining and reclamation.	**Rate of habitat loss and reclamation much less than Proposed Action.**	Weed control could be included as part of the applicant's reclamation plan (A).	None expected with mitigation.
Noise and other activities would cause some wildlife to leave or avoid adjacent habitats that would otherwise be suitable. Noise associated with mining in the upland areas of the site would include heavy equipment, the conveyor system, and vehicles and trucks. Animals that occur in and around the existing developments on the island would likely be the same species that occur near activities at the mine.	**Similar to Proposed Action** with less disturbance at night.	**Similar to Alternative 1.**	**Much less disturbance than Proposed Action** due to low level of mining.	See above mitigation for "reduced wildlife habitat onsite" impact.	None expected with additional mitigation (see above).

Table S-5. Summary of Significant Impacts, Mitigation, and Unavoidable Adverse Impacts for Marine Habitat and Fisheries

Significant Impacts					
Proposed Action	***Alternative 1***	***Alternative 2***	***No-Action***	***Mitigation for Action Alternatives*** *(R = mitigation measures required or already proposed by the applicant A = additional mitigation measures)*	***Significant Unavoidable Adverse Impacts***
Primary Issue: Would shading from barges at the dock adversely affect eelgrass or other marine biological communities?					
Barge shading not expected to significantly reduce eelgrass or kelp beds because (1) no eelgrass or kelp is present and habitat is not suitable where shading would occur, (2) shading may alter only a small area containing common invertebrate species on the dock, (3) tugboats would typically be aligned to the barge during loading, with the propeller wash oriented parallel to or away from shore at a depth where eelgrass does not grow.	**Similar to Proposed Action.** Barges could be tied up at the dock during more daylight hours, since night loading would not occur, but this would not shade eelgrass or kelp beds.	**Similar to Proposed Action.** Barges would be loaded only during daylight hours, but fewer average hours per day would be required than under the Proposed Action and this would not shade eelgrass or kelp beds.	**No increase in shading** because no barge activity or modifications to the dock would occur.	To define the specific areas where eelgrass and bull kelp occur, the applicant will conduct additional surveys between June 1 and October 1. (R) Prior to construction, a marine monitoring and mitigation plan would be prepared and a program initiated to monitor eelgrass coverage and density and sediment deposition during operation of the project. The plan would be prepared by a third-party consultant and approved by King County and DNR prior to permit approval.(R)	None expected with required mitigation.
Primary Issue: Would accidental spillage of sand and gravel during barge loading adversely affect marine life under or near the dock and barges?					
No significant impacts anticipated because (1) a spill tray would be installed; (2) the area where minor spillage is expected (where the conveyer belt would dump material onto the barge and along the sides of the barge) does not contain eelgrass, kelp beds, or other primary features of concern, and gravel has already been deposited in this area; (3) the operator will have a high incentive not to spill because of loss of revenue, interference with barge docking, and costs of environmental restoration; (4) an automatic conveyor shutoff switch would be used to prevent the conveyor from running unless a barge is docked.	**No significant impacts.** The potential for accidental sand and gravel spillage would be somewhat less than under the Proposed Action, since less material would be loaded with the conveyor system.	**No significant impacts.** The potential for accidental sand and gravel spillage would be somewhat less than under the Proposed Action or under Alternative 1, since less material would be loaded with the conveyor system.	**No risk of accidental sand and gravel spillage** because barging and use of the conveyor would not occur.	A spill tray would be fitted below the conveyor belt from the beach out to the discharge end. The tray would be checked and maintained on a regular schedule. (R) The conveyor belt would be equipped with an automatic power interrupt switch, which engages if no barge is in place to accept the material. (R) To ensure the risks of aggregate spillage remain low, the project should be periodically monitored for evidence of spills. (A)	None expected with required and additional mitigation.

Table S-5. Continued

Significant Impacts					*Significant Unavoidable Adverse Impacts*
Proposed Action	***Alternative 1***	***Alternative 2***	***No-Action***	***Mitigation for Action Alternatives*** *(R = mitigation measures required or already proposed by the applicant A = additional mitigation measures)*	
				The applicant has agreed to pay for restoration of any sand and gravel spills, and this agreement should be placed as a condition of permit approval. (A)	
Primary Issue: What would be the potential for petroleum spills from increased marine equipment activity?					
Minor possibility of accidental spills of petroleum products because (1) no vessel refueling would take place at the project site, (2) all vessels would operate in compliance with Coast Guard regulations to limit the potential for petroleum spills, (3) barges would be hauling sand and gravel, not petroleum products, (4) all vessels would operate with spill containment equipment aboard.	**Minor risk of petroleum spills (less than Proposed Action)** because fewer barge trips would likely occur each day.	**Minor risk of petroleum spills (less than Proposed Action or Alternative 1)** because fewer barge trips would likely occur each day.	**No risk of petroleum spills** from marine traffic due to the project because no barge loading would occur.	All tugs and other potential sources of petroleum product spills would be equipped with emergency spill response and clean-up equipment. (R) A spill response and containment plan for site mining activity would be prepared. (R)	None expected with mitigation.
Primary Issue: Would an increase in turbidity and deposition of fine sediment from mining and barge traffic propellor wash affect marine organisms?					
No reduction in marine water quality expected. Surface water from the mining operation would infiltrate to the underlying aquifer via the proposed retention/infiltration pond. Significant impacts to groundwater quality from onsite mining activities would not be anticipated.	Same as Proposed Action.	Same as Proposed Action.	Same as Proposed Action.	None required.	None expected.
Low potential for sediment disturbance effects because (1) tug operations would be conducted in deeper waters where propeller wash would be largely dissipated by the time it hits bottom; (2) propellor wash would be directed parallel to or away from shore; (3) sensitive habitat is close to the shoreline and away from the proposed tug traffic; (4) currents continuously flush the southeast side of Maury Island and would prevent disturbed sediment from causing a decrease in dissolved oxygen.	**Low potential for sediment disturbance effects** (less than Proposed Action because fewer barge loads required per day).	**Low potential for sediment disturbance effects** (less than Proposed Action or Alternative 1 because fewer barge loads required per day).	**No potential for marine sediment disturbance** due to the project since no barge loading or shipping would take place.	None required.	None expected.

Table S-5. Continued

Significant Impacts					
Proposed Action	***Alternative 1***	***Alternative 2***	***No-Action***	***Mitigation for Action Alternatives*** *(R = mitigation measures required or already proposed by the applicant A = additional mitigation measures)*	***Significant Unavoidable Adverse Impacts***
Primary Issue: Would removing a portion of the bluff during mining change the deposition/erosion dynamics of the beach?					
Erosion and deposition dynamics of the beach not expected to change. The existing bluff is well vegetated in the vicinity of the project site, and contributes much less sediment to the beach than an unvegetated bluff would. The applicant would leave a 200-foot vegetated buffer from the beach inland that would continue to provide protection against erosion.	**Similar to Proposed Action.** Change in topography would presumably take place over a longer time since mining would occur at a slower rate.	**Similar to Proposed Action and Alternative 1.** Change in topography would presumably take place over a longer time since mining would occur at a slower rate.	**No changes in beach erosion/deposition dynamics** because changes in topography would occur slowly over many years.	None required.	None expected.
Primary Issue: What effect would the project have on geoduck clam harvest by the Puyallup Tribe?					
Restricted access for geoduck divers in vicinity of dock during barge loading operations because of unsafe conditions.	**Similar to Proposed Action.** It might be more difficult to schedule access for geoduck divers, since barge loading could only occur during more limited hours.	Same as Alternative 1.	**No reduction in access** to the site by geoduck divers because no barge loading would occur.	The Puyallup Tribe will periodically require access to geoduck beds in the vicinity of the loading dock (roughly once per year). Since it will be unsafe to harvest during barge loading, an agreement should be established prior to project initiation that will provide adequate access for Puyallup Tribe geoduck divers. Access for part of the year near the dock that allows 2 percent annual harvest should suffice. (A)	None expected with mitigation.

Table S-5. Continued

Significant Impacts					*Significant Unavoidable Adverse Impacts*
Proposed Action	***Alternative 1***	***Alternative 2***	***No-Action***	***Mitigation for Action Alternatives*** *(R = mitigation measures required or already proposed by the applicant A = additional mitigation measures)*	
Primary Issue: Would the noise and vibration from pile driving or barge loading affect salmon and other marine animals, including whales?					
Minimal effects on juvenile or adult salmon. Adult salmon would easily be able to avoid vessel traffic and propeller wash. The site shoreline does not provide a freshwater transitional area for juvenile salmon to adapt to salt water. The site does not provide unique juvenile rearing or migration habitat. Pile driving or other activities may increase the risk of some juveniles falling prey to birds or fish, but overall effects on salmon populations would be minor.	Same as Proposed Action.	Same as Proposed Action.	**No effect on juvenile or adult salmon** because barging would not occur.	None required.	None expected.
Negligible effects on marine mammals because (1) these species are tolerant of human activity, and (2) the project site is not a major feeding, congregation, breeding, or migration area.	Same as Proposed Action.	Same as Proposed Action.	**No effect on marine mammals** because these activities would not occur.	None required.	None expected.
Primary Issue: Would dock repairs alter salmon habitat or other marine habitats?					
Temporary, nonsignificant increase in turbidity expected because (1) existing failed pilings would be left in place or cut off at the sediment surface, (2) currents would disperse turbid water from the site, (3) dock repairs would be completed in 2 to 4 weeks, (4) sediment disturbance would be intermittent, (5) juvenile salmon would be able to avoid temporarily turbid water, and (6) sediment disturbance would not be great enough to bury eelgrass or algae.	Same as Proposed Action.	Same as Proposed Action.	**No increase turbidity** since dock repairs would not be required.	Dock repairs would follow WAC guidelines (R). Recycled pilings should be used for dock repairs and maintenance. (A)	None expected with mitigation.

Table S-6. Summary of Significant Impacts, Mitigation, and Unavoidable Adverse Impacts for Noise

Significant Impacts					
Proposed Action	***Alternative 1***	***Alternative 2***	***No-Action***	***Mitigation for Action Alternatives*** *(R = mitigation measures required or already proposed by the applicant A = additional mitigation measures)*	***Significant Unavoidable Adverse Impacts***
Primary Issue: Would noise levels resulting from the project exceed regulatory standards at nearby residences?					
No impacts during initial construction work. At a distance of 1,000 feet from the project site, sound levels from construction activities (e.g., reconstruction of the conveyor system and maintenance of the loading dock) would not result in significant impacts. In addition, construction would occur only during the daytime hours and would be exempt from the King County Noise Code.	Same as Proposed Action.	Same as Proposed Action.	**No significant impacts** because of low level of mining.	None required.	None expected.
Impacts could occur under certain conditions, and in specific areas, during the later stages of mining. With a 2 meter/second wind blowing from the primary sound sources toward each receptor, project-related sound levels would comply with King County's daytime and nighttime standards at all locations except at individual residences located in a residential area on a hill overlooking the Gold Beach community. Noise from nighttime barge-loading operations could exceed the 47 dBA limit at these locations with a wind blowing from the southwest to the northeast. These impacts would occur during the later stages of mining when most of the intervening topography on the project site would have been excavated. Sound levels under calm conditions (no wind) with maximum mining production would meet King County's standards.	**Impacts similar to Proposed Action but of shorter duration** because fewer barges would be loaded at night.	Same as Alternative 1.	**No significant impacts** because of low level of mining.	Construction of a 12-foot berm along the western perimeter and in the northeastern corner of the site to ensure that there would always be a sufficient barrier between operating equipment and nearby residences. (R) Regular maintenance of the conveyor system and the barge loading conveyor to ensure that squeaking of the equipment is minimized. (R) Use of strobe lights instead of audible alarms for back-up warning devices used onsite during nighttime operations. (R) Employ radar-based backup warning systems on all heavy equipment. Approval by the Washington State Department of Labor and Industry for this type of alarm system would be required. (A)	Significant impacts (exceedance of King County noise limits) can be avoided through mitigation. However, people in adjacent communities would still be able to hear mining at the site.

Table S-6. Continued

Significant Impacts					
Proposed Action	***Alternative 1***	***Alternative 2***	***No-Action***	***Mitigation for Action Alternatives*** *(R = mitigation measures required or already proposed by the applicant A = additional mitigation measures)*	***Significant Unavoidable Adverse Impacts***
				The applicant could retain a consultant to monitor sound levels produced by noise-generating activities and report such findings to King County to ensure compliance with applicable standards. Monitoring would be conducted at or near the residential locations exposed to the highest project-related sound levels during the monitoring period. If the County determines that project-related activities are resulting in violations of noise criteria, the applicant would be required to implement additional sound reduction measures. (A) The County could establish an advisory committee to monitor and evaluate complaints relating to the project. The advisory committee would be composed of representatives of the mining operator, area residents, and King County staff. (A) The site buffer could be expanded along the eastern and western perimeter. (A)	

Table S-7. Summary of Significant Impacts, Mitigation, and Unavoidable Adverse Impacts for Transportation

Significant Impacts					
Proposed Action	***Alternative 1***	***Alternative 2***	***No-Action***	***Mitigation for Action Alternatives*** *(R = mitigation measures required or already proposed by the applicant A = additional mitigation measures)*	***Significant Unavoidable Adverse Impacts***
Primary Issue: Would truck traffic resulting from the project increase congestion or degrade traffic operations on local streets?					
No impacts expected. The total daily vehicle trips at the site during the p.m. peak hour would be relatively small (approximately 20 exiting employees, 2 entering truck trips, 2 exiting truck trips). The proposed future activity levels would also be similar to existing conditions. At a growth rate of 2.5 percent per year, it would take approximately 30 years for the daily truck traffic to double to 40 daily trips.	**No impacts expected** (same as Proposed Action).	**No impacts expected** (same as Proposed Action).	**No impacts expected** (same as Proposed Action).	None required	None expected.
Primary Issue: To what extent would tug and barge traffic affect or be affected by other boat traffic on Puget Sound, including increased risk of collisions or spills?					
No significant impact expected because of Coast Guard vessel traffic monitoring requirements, tug/barge speeds, the very low frequency of shipping operations south of Alki Point, and requirements for contractors transporting mined material to sign an agreement that strictly prohibits oil/fuel dumping and includes provisions for accidental-spill response procedures, financial liability, and notification requirements.	**No significant impacts** (same as Proposed Action).	**No significant impacts** (same as Proposed Action).	No impacts because no barge activity would occur at the Maury Island site.	Vessels would follow Coast Guard requirements for operating in Puget Sound. (R) Contractors transporting mined material would sign an agreement that strictly prohibits oil/fuel dumping and includes provisions for accidental-spill response procedures, financial liability, and notification requirements. Accidental-spill provisions and available spill-response equipment would be specified in a Spill Response and Containment Plan submitted to the DNR, Department of Ecology, and King County before barge loading occurs. (R) The owner should require normal reporting of arrival/departure activities under the Coast Guard vessel monitoring system for all tugs serving the dock and Des Moines (a high-potential delivery point for the Proposed Action). (A)	None expected.

Table S-7. Continued

Significant Impacts					***Significant Unavoidable Adverse Impacts***
Proposed Action	***Alternative 1***	***Alternative 2***	***No-Action***	***Mitigation for Action Alternatives*** *(R = mitigation measures required or already proposed by the applicant A = additional mitigation measures)*	
Primary Issue: Would tug/barge tows cause wake effects?					
No wake effects expected because (1) tug/barge tows generate essentially no wake when under tow due to their extremely low velocity, and (2) the Coast Guard regulates vessel speed to reduce wakes when tide levels are at or above 11 feet mean lower low water.	**No wake effects expected** (same as Proposed Action).	**No wake effects expected** (same as Proposed Action).	**No impacts** because barging would not occur at the Maury Island site.	The Coast Guard regulates vessel speed to reduce wakes when tide levels are at or above 11 feet mean lower low water. (R)	None expected.
Primary Issue: How would the addition of barge traffic affect the Washington State Ferry System?					
Potential for momentary delays of some ferry routes, but no significant disruption of ferry operations expected. The Fauntleroy/Vashon run, Bremerton and Bainbridge passenger and auto runs, and the Vashon passenger ferry may experience momentary delays as ferries give the right-of-way to commercial vessels crossing their routes.	**No significant impacts** on ferry operations.	**No significant impacts** on ferry operations.	**No effects on ferry routes** because barging would not occur at the project site.	None required.	None expected.

Table S-8. Summary of Significant Impacts, Mitigation, and Unavoidable Adverse Impacts for Land and Shoreline Use

Significant Impacts					
Proposed Action	***Alternative 1***	***Alternative 2***	***No-Action***	***Mitigation for Action Alternatives*** *(R = mitigation measures required or already proposed by the applicant A = additional mitigation measures)*	***Significant Unavoidable Adverse Impacts***
Primary Issue: Is the applicant's proposal consistent with applicable land use policies and regulations?					
Consistent with King County Comprehensive Plan designation of the site as mineral resource lands.	**Same as Proposed Action.**	**Same as Proposed Action.**	**Same as Proposed Action.**	None required.	None expected.
Consistent with site zoning as M (Mineral Resources) under KCC Title 21A, except that fencing has not been proposed to discourage access to hazardous areas. The project would not affect the designated Erosion Hazard Area along the shoreline.	**Same as Proposed Action.**	**Same as Proposed Action.**	**Same as Proposed Action.**	None required.	None expected.
Statutory requirements of Washington State Surface Mining Act are being met through the applicant's submittal of a modified reclamation plan to DNR.	**Same as Proposed Action.**	**Same as Proposed Action.**	**Same as Proposed Action.**	None required.	None expected.
Project would require a King County Shorelines Substantial Development Permit for dock and conveyor repair.	**Same as Proposed Action.**	**Same as Proposed Action.**	Shorelines Substantial Development Permit not required since dock repairs not needed.	None required.	None expected.
DNR Aquatic Lands Lease has been regularly updated by the applicant.	**Same as Proposed Action.**	**Same as Proposed Action.**	**Same as Proposed Action.**	None required.	None expected.
Army Corps of Engineers individual permit required for dock repairs.	**Same as Proposed Action.**	**Same as Proposed Action.**	Corps permit not needed since dock repairs not required.	None required.	None expected.

Table S-8. Continued

Significant Impacts					
Proposed Action	***Alternative 1***	***Alternative 2***	***No-Action***	***Mitigation for Action Alternatives*** *(R = mitigation measures required or already proposed by the applicant A = additional mitigation measures)*	***Significant Unavoidable Adverse Impacts***
Primary Issue: What land use changes would occur directly or indirectly, to the project site and adjacent lands, as a result of the proposal?					
Change in site land use from a low-level to a high-production mining operation. Existing open space features would be removed and reclaimed in phases per the applicant's proposal. The community's informal recreational use of the property would decrease.	**Similar to Proposed Action**, but changes in land use and subsequent reclamation would occur at a slower rate due to the increased duration of the project.	**Same as Alternative 1.**	**Mining would occur at a very slow pace and therefore would not be as noticeable.**	Measures listed in King County Code Chapter 21A.22 and those required by DNR would provide specific requirements for developing and operating the mine. (R) Increase the vegetated site perimeter to reduce potential conflicts with or disturbances to adjacent residences. (A)	None are identified. The project would increase industrial land use on the project site, which had previously been less developed. The project would also increase shoreline activity due to loading, barging and tugboat assistance. However, all of these activities are consistent with existing Mineral zoning with which the site is currently designated.

Table S-8. Continued

Significant Impacts					*Significant Unavoidable Adverse Impacts*
Proposed Action	***Alternative 1***	***Alternative 2***	***No-Action***	***Mitigation for Action Alternatives*** *(R = mitigation measures required or already proposed by the applicant A = additional mitigation measures)*	
Existing land uses in site vicinity would remain as is or develop as zoned. It is possible that the residential property that is currently undeveloped would not develop as quickly as under No-Action, due to increased mining activity on the project site. If DNR disposes of their adjoining 60 acres (currently zoned one dwelling unit per 10 acres), it could be developed as residential properties at that density.	**Same as Proposed Action.**	**Same as Proposed Action.**	**Development of surrounding parcels would continue as currently zoned and permitted.** DNR disposal of their 60 acres possible.	None required.	None expected.

Table S-9. Summary of Significant Impacts, Mitigation, and Unavoidable Adverse Impacts for Environmental Health and Safety

Significant Impacts					***Significant Unavoidable Adverse Impacts***
Proposed Action	***Alternative 1***	***Alternative 2***	***No-Action***	***Mitigation for Action Alternatives*** *(R = mitigation measures required or already proposed by the applicant A = additional mitigation measures)*	
Primary Issue: Would mining remobilize the existing arsenic in the site topsoils as air contamination and dust?					
Potential for contaminated materials to be blown away as dust would be effectively mitigated.	**Same as Proposed Action.**	**Same as Proposed Action.**	**No dust impacts** due to low level of mining and required soil management practices.	Air emission control methods would be implemented during all excavation and cleanup activities that have the potential to generate air pollutants. These methods include the use of controlled excavation methods, wetting, material covering, housekeeping, vacuuming, and use of covered trucks. (R) The applicant has proposed to monitor ambient air quality on the property perimeter during cleanup activities at the site. The ambient air-monitoring plan would describe the basis of design for the monitoring program; general program procedures; air sampling procedures; meteorological monitoring procedures; laboratory methods; and references. Pollutants to be monitored include total suspended particulates, lead, and arsenic. Air quality action levels would be used as an indicator of the effectiveness of onsite emission control methods. In the event that single data point concentrations exceed the action limit criteria, a contingency plan detailing additional control measures would be implemented. The action levels for the potential air pollutants monitored will be established in conjunction with the Puget Sound Air Pollution Control Agency, King County Health Department, and the Department of Ecology. (R)	None expected with mitigation.

Table S-9. Continued

Significant Impacts					
Proposed Action	***Alternative 1***	***Alternative 2***	***No-Action***	***Mitigation for Action Alternatives*** *(R = mitigation measures required or already proposed by the applicant A = additional mitigation measures)*	***Significant Unavoidable Adverse Impacts***
				Workers onsite must have sufficient training and safety equipment to control their potential exposure to soil contaminants. Exposure monitoring must be done during topsoil management to determine if the action level is reached or exceeded. If the action level of 5 micrograms per cubic meter (averaged over an 8-hour period) is exceeded, additional engineering controls and worker protection will be required by state law. The additional measures could consist of workers wearing respiratory protection or using additives to further stabilize the soils and reduce dust generation. (R) Contaminated soils should be cleared and collected in manageable phases. No more than 2 acres of contaminated materials should be exposed at any one time. (A) Contaminated soils should be covered while being temporarily stockpiled or transported to the containment cell. Soils should be transported by covered truck, rather than by conveyor or open-bed truck. (A)	
				Temporary covers should be placed over contaminated material within containment cells prior to final sealing of the cell. (A)	

Table S-9. Continued

Significant Impacts					
Proposed Action	***Alternative 1***	***Alternative 2***	***No-Action***	***Mitigation for Action Alternatives*** *(R = mitigation measures required or already proposed by the applicant A = additional mitigation measures)*	***Significant Unavoidable Adverse Impacts***
Primary Issue: Would mining remobilize the existing arsenic in the site topsoils as surface water contamination?					
Arsenic would not travel offsite via surface waters because (1) there are no streams or other surface water on the site, (2) laboratory testing of arsenic-tainted soils has demonstrated that site arsenic deposits are highly resistant to leaching, and (3) contaminated soils would be contained.	**Same as Proposed Action.**	**Same as Proposed Action.**	**Same as Proposed Action.**	At the request of King County, the applicant has prepared a draft soils management plan to allow public and agency review and comment on proposed measures. The draft management plan proposes to contain contaminated soils in a lined and covered containment cell located on the north side of the property. No topsoils would be removed from the site. Following public and agency review of the draft plan, King County will require that the applicant complete a final soils management plan to be included as part of the Final EIS. The plan shall be accepted and approved by King County prior to issuance of a permit for mining above current levels at the site. (R)	None expected with mitigation.
Primary Issue: Would the arsenic be present in soils to be sold and exported from the site?					
Contaminated materials would not be sold; they would be segregated and contained onsite.	**Same as Proposed Action.**	**Same as Proposed Action.**	**Same as Proposed Action.**	The applicant's draft soils management plan includes containment of contaminated soils (see above).	None expected with mitigation.

Table S-9. Continued

Significant Impacts					
Proposed Action	***Alternative 1***	***Alternative 2***	***No-Action***	***Mitigation for Action Alternatives*** *(R = mitigation measures required or already proposed by the applicant A = additional mitigation measures)*	***Significant Unavoidable Adverse Impacts***
Primary Issue: Would arsenic enter groundwater as a result of the proposal?					
Arsenic would not enter groundwater because (1) arsenic is tightly bound to site topsoils and is nonleachable, and (2) the applicant would contain contaminated soils using a lined and covered containment cell.	**Same as Proposed Action.**	**Same as Proposed Action.**	**No groundwater impacts expected** because the applicant would operate under an agreement with Ecology to prevent significant groundwater impacts.	The applicant's draft soils management plan includes containment of contaminated soils (see above).	None expected with mitigation.
Primary Issue: Would tug propeller wash stir up contaminated sediments and harm endangered fish species or other marine life?					
Negligible potential for impacts because (1) arsenic that was deposited on the waters of Puget Sound has been diluted by waves and currents, (2) sediments are subject to wave action, drift, and storms that mix sediments and dilute arsenic, and (3) tugs would be positioned in deep water with propellor wash directed parallel to or away from shore, minimizing the amount of sediment disturbance.	**Same as Proposed Action.**	**Same as Proposed Action.**	**No impacts** because barging would not occur.	None required.	None expected.

Table S-10. Summary of Significant Impacts, Mitigation, and Unavoidable Adverse Impacts for Light, Glare and Aesthetics

Significant Impacts					
Proposed Action	***Alternative 1***	***Alternative 2***	***No-Action***	***Mitigation for Action Alternatives*** *(R = mitigation measures required or already proposed by the applicant A = additional mitigation measures)*	***Significant Unavoidable Adverse Impacts***
Primary Issue: What aesthetic changes would occur in the character of the existing landscape on the mine site?					
Visual contrasts in the landscape and more obvious signs of human activity would occur. Heavy equipment would be visible onsite during the day. At any one time, up to 64 acres would be relatively void of vegetation. Unnatural "benches" would appear along the slope at final grade. The containment berm would appear unnatural without vegetative cover. Assuming restoration of madrone forest, mined out areas at final grade would develop similar tones and textures as existing forests within about 20 years, with noticeable improvement within about 5 to 15 years.	**Similar to Proposed Action**, but changes in visual character of the site would occur more gradually and over a longer time.	**Similar to Proposed Action**, but changes in visual character of the site would occur more gradually and over a longer time.	**Visual impacts less than Proposed Action, Alternative 1 and Alternative 2 but would occur over an indefinite number of years** due to low level of mining.	As required by the Washington State Surface Mining Act, active mining/reclamation activities would be limited to 64 acres at a time, up to two 32-acre phases (one being mined, the other being actively reclaimed). (R) Hydroseed slopes and plant the floor of the mine with Douglas-fir. (R) Restore forest wherever possible. (A) To provide a more natural appearance, contour slopes with undulating terracing, rather than traditional linear terracing. (A)	Increased mining and barging would change the overall visual character of the site. Because the site is located near a shoreline, the site could be visible from many vantage points. The types of visual changes that would occur are to be expected under the Mineral zoning with which the site is currently designated. Additional mitigation measures would reduce the total area that would be visible at any one time.

Table S-10. Continued

Significant Impacts					*Significant Unavoidable Adverse Impacts*
Proposed Action	***Alternative 1***	***Alternative 2***	***No-Action***	***Mitigation for Action Alternatives*** *(R = mitigation measures required or already proposed by the applicant A = additional mitigation measures)*	
Nearby residents would have views of mining during some phases. The third phase of mining would excavate the western edge of the site and be visible to Gold Beach and the Sestrap and Saunders properties. At the end of the fourth phase, mining would occur adjacent to low-density housing along the northern portion of the site. During the sixth phase, the operation would be at its closest to the Gold Beach community and the Sandy Shores community would have direct views of this phase.	**Similar to Proposed Action**, but changes in visual character of the site would occur more gradually and over a longer time.	**Similar to Proposed Action**, but changes in visual character of the site would occur more gradually and over a longer time.	**Visual impacts less than Proposed Action, Alternative 1 and Alternative 2 but would occur over an indefinite number of years** due to low level of mining.	The applicant's proposed 50-foot vegetated perimeter buffer and 200-foot shoreline buffer would help obscure views of mining. (R) Increase the buffers at the western and eastern corners of the site. (A)	See above.
Views of the site from across Puget Sound would change with contrasting colors of cleared and actively mined areas compared to forested and reclaimed areas. Long-term topographical changes would be visible but not intrusive. Some terracing may be visible and appear unnatural before vegetation grows in.	**Similar to Proposed Action**, but changes in visual character of the site would occur more gradually and over a longer time.	**Similar to Proposed Action**, but changes in visual character of the site would occur more gradually and over a longer time.	**Visual impacts less than Proposed Action, Alternative 1 and Alternative 2 but would occur over an indefinite number of years** due to low level of mining.	See measures listed above.	See above.

Table S-10. Continued

Significant Impacts					
Proposed Action	***Alternative 1***	***Alternative 2***	***No-Action***	***Mitigation for Action Alternatives*** *(R = mitigation measures required or already proposed by the applicant A = additional mitigation measures)*	***Significant Unavoidable Adverse Impacts***
During night operations, lights from heavy mining equipment and trucks would be visible to some residents, including strobe lights used for backup alarms. During periods of inactivity the nighttime landscape would appear essentially the same as it is now.	Much lower level of night-time operations would reduce impacts.	Lower night-time activity than Alternative 1, with little or no night-time impacts.	Hours of operation would remain as is, rather than the more extended hours of mining with the Proposed Action and Alternative 1.	None proposed.	See above.
Primary Issue: How would the reintroduction of barging affect the visual environment?					
Barge loading would be visible to residents since the dock juts out from the shoreline. During times of active mining, barges could be loaded almost constantly at the site. The activity would introduce industrial characteristics to the beach. Other tugs with barges may also be seen as they hold offshore to wait as another barge is being loaded. Up to four 10,000-ton barges (or a greater number of smaller barges) would be visible with the Proposed Action, potentially 24 hours a day.	**Impacts less than Proposed Action.** Barging 16 hours per day (rather than 24 hours in the Proposed Action) would leave a portion of the day with no visible mining activity. Two 10,000-ton barges loaded in each weekday and one on Saturday (or a greater number of smaller barges) would be seen entering, being loaded, and then leaving the site.	**Impacts less than Proposed Action.** Barges may be seen at the site up to 12 hours per day except Sundays, when no barging would occur.	**Minimal changes in views.** No barge loading or tugboat activity would occur. The dock would remain in its existing condition.	None proposed.	See above.

Table S-10. Continued

Significant Impacts					*Significant Unavoidable Adverse Impacts*
Proposed Action	***Alternative 1***	***Alternative 2***	***No-Action***	***Mitigation for Action Alternatives*** *(R = mitigation measures required or already proposed by the applicant A = additional mitigation measures)*	
At night, barge loading would be visible due to lighting on tugs and on the dock. Lighting would be shielded to direct light into the barge. Tug pilots may use spotlights or bright deck lights as needed to maneuver barges.	**Impacts less than Proposed Action.** Barging 16 hours per day (rather than 24 hours in the Proposed Action) would leave a portion of the day with no visible mining activity. Two 10,000-ton barges loaded in each weekday and one on Saturday (or a greater number of smaller barges) would be seen entering, being loaded, and then leaving the site.	**Impacts less than Proposed Action.** Barges may be seen at the site up to 12 hours per day except Sundays, when no barging would occur.	Hours of operation would remain as is, rather than the more extended hours of mining with the Proposed Action and Alternative 1.	None proposed.	See above.

Table S-11 Summary of Significant Impacts, Mitigation, and Unavoidable Adverse Impacts for Recreation

Significant Impacts					
Proposed Action	***Alternative 1***	***Alternative 2***	***No-Action***	***Mitigation for Action Alternatives*** *(R = mitigation measures required or already proposed by the applicant A = additional mitigation measures)*	***Significant Unavoidable Adverse Impacts***
Primary Issue: Would the project interfere with the public use and enjoyment of any formal or informal recreational sites in the area?					
Areas available for informal recreation on the site would be reduced as the site is mined. Land yet to be mined and reclaimed areas may be available for recreation. During periods of inactivity, much of the site could be available for informal uses. Liability and safety issues would need to be addressed by the operator of the mine. Parks in the vicinity are not close enough to be affected by traffic, equipment, or noise. Views of barges would not be incompatible with experiences at Maury Island Marine Park.	Similar to Proposed Action.	Similar to Proposed Action.	**The applicant is likely to continue to restrict public access** to the site (except for beach access).	Mitigation not required because the site is a privately owned and operated gravel mine, and the applicant is not obligated to provide access for recreation. To the extent that liability issues can be resolved, the applicant would allow access to the shoreline. (R) To offset the reduction in accustomed (yet unauthorized) use of the site by residents, the applicant could allow recreational use along the perimeter or inactive areas of the site. For example, a trail and viewpoint could be established overlooking the shoreline and the site. (A) To ensure safe operation of the mine and compatible recreational use, access would need to be controlled. Control measures could include fencing or posting of signs. More elaborate techniques to control access could include development of areas to attract or direct people away from active mining areas. (A) The applicant could coordinate with the community and King County to identify appropriate uses and to inform the public on recreational use of the property, and produce some new recreational opportunities for the community. (A)	Loss of onsite recreational opportunities outside of shoreline areas is not considered a significant impact since the operator is not obligated to provide such use. Recreation may be available within inactive portions of the site if such agreements are established between the mine operator, King County, or others.

Table S-11. Continued

Significant Impacts					*Significant Unavoidable Adverse Impacts*
Proposed Action	***Alternative 1***	***Alternative 2***	***No-Action***	***Mitigation for Action Alternatives*** *(R = mitigation measures required or already proposed by the applicant A = additional mitigation measures)*	
The shoreline would be more active, with barges and tugs, the conveyor system, exposed sand and gravel, and equipment and workers. To the extent that liability issues can be resolved, the shoreline would remain available for public use.	**Impacts similar to but less than Proposed Action.** Early morning, evening, and Sunday walks for residents along the shoreline or on adjacent bluffs may be more peaceful since barge loading would not occur at these times.	**Impacts similar to but less than Proposed Action.** Early morning, evening, and Sunday walks for residents along the shoreline or on adjacent bluffs may be more peaceful since barge loading would not occur at these times.	**Barging and related impacts would not occur.**	The applicant plans to construct safety features in the conveyor system and dock (e.g., overhead protection) to allow for safe pedestrian passage under the facility along the shoreline. (R) To the extent that liability issues can be resolved, the applicant would allow access to the shoreline. (R)	None expected..
The attractiveness of the waterfront for recreational boaters would be reduced with 24-hour barging. Boaters using Dockton Park marina would not be affected.	**Similar to Proposed Action** (but with reduced hours of barging).	**Similar to Proposed Action** (but with reduced hours of barging).	**Barging and related impacts would not occur.**	None proposed.	None expected since relatively few people would be affected and many other oppportunities are available.
Diving opportunities along the site shoreline would be essentially eliminated during active mining.	**Recreational scuba divers would be able to dive on Sundays.**	**Similar to Alternative 1.**	**Barging and related impacts would not occur.**	None proposed.	Same as above.